

Fluorodeoxyglucose-PET/CT for Diagnosis of Intravascular Large B-Cell Lymphoma

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A 39-year-old woman was referred to our hospital with a 1-month history of recurrent fever. On physical examination, her spleen was palpable in the absence of peripheral lymphadenopathy and skin lesions. Laboratory studies yielded elevated values of serum lactate dehydrogenase at 1051 U/L, soluble interleukin 2 receptor at 24,500 pg/mL, and ferritin at 1019 μ g/L. Blood cell counts showed a bicytopenia with a hemoglobin level of 7.0 g/dL and a platelet count of 3.7×10^9 /L. Although the patient had no subjective symptoms such as dyspnea, her percutaneous oxygen saturation was low at 90%, suggesting hypoxemia. Findings on both chest radiography and computed tomography (CT) of the lungs were unremarkable. However, positron emission tomography (PET)/CT with 18F-fluorodeoxyglucose (FDG) revealed diffuse uptake in the bilateral lung, predominantly in the upper fields (Figure 1, A and B). In addition, FDG uptake was noted in the bilateral renal cortex (Figure 1, C) and vertebrae (Figure 1, A).

Bone marrow aspiration yielded large atypical lymphoid cells with the appearance of hemophagocytosis. However, on bone marrow biopsy, lymphoma cells were not confirmed within the lumen of small blood vessels. Random skin biopsy specimens¹ from normal-appearing skin on the patient's thigh revealed CD20⁺ large lymphoid cells filling the small vessels in the subcutaneous tissues (Figure 1, D and E). Intravascular large B-cell lymphoma (IVLBCL) was diagnosed.

Emerging evidence shows the usefulness of PET/CT in diagnosing lymphoma.² However, its role in IVLBCL is unknown, mainly because of the rarity and the variety of its clinical presentation. Recently, we performed PET/CT in 4 consecutive patients who fulfilled the early diagnostic criteria for IVLBCL³ and found the characteristic pattern of FDG uptake: (1) diffuse accumulation in the bilateral lung field, (2) accumulation in the bilateral renal cortex, and (3) multiple accumulations in the bones (Figure 2, A-H). From an anatomic viewpoint, lungs and kidneys are affected by IVLBCL cells because these organs are rich in small blood vessels. Indeed, autopsies have revealed the high frequency of lymphomatous involvement in lungs and kidneys. We suggest that FDG-PET/CT be performed for early diagnosis of IVLBCL, which is important for effective therapeutic intervention.

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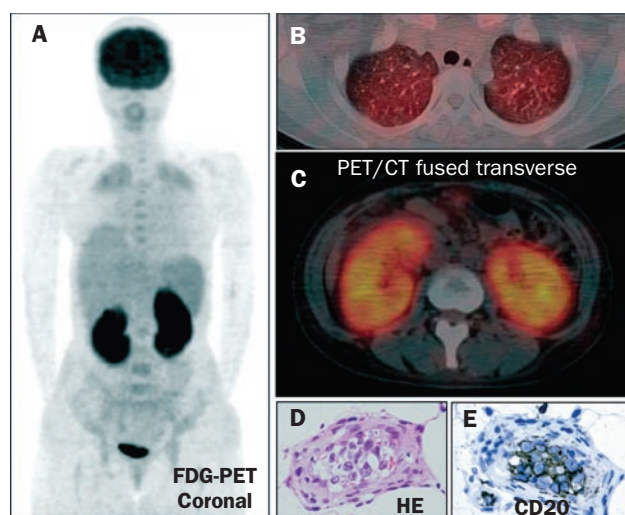


FIGURE 1. A-C, Positron emission tomography (PET)/computed tomography (CT) findings in a patient with intravascular large B-cell lymphoma. Characteristic pattern of 18F-fluorodeoxyglucose (FDG) uptake with diffuse accumulation in the bilateral lung field (A, B) and accumulation in the bilateral renal cortex (A, C) and vertebrae (A). D-E, Random biopsy specimens from normal-appearing skin revealed large atypical lymphoid cells filling the small vessels (D, hematoxylin-eosin [HE], original magnification x400). These cells are positive for CD20, confirmed by immunohistochemical analysis (E, original magnification x400).

1. Asada N, Odawara J, Kimura S, et al. Use of random skin biopsy for diagnosis of intravascular large B-cell lymphoma. *Mayo Clin Proc.* 2007;82(12):1525-1527.

2. Seam P, Juweid ME, Cheson BD. The role of FDG-PET scans in patients with lymphoma. *Blood.* 2007;110(10):3507-3516.

3. Masaki Y, Dong L, Nakajima A, et al. Intravascular large B cell lymphoma: proposed of the strategy for early diagnosis and treatment of patients with rapid deteriorating condition. *Int J Hematol.* 2009;89(5):600-610.

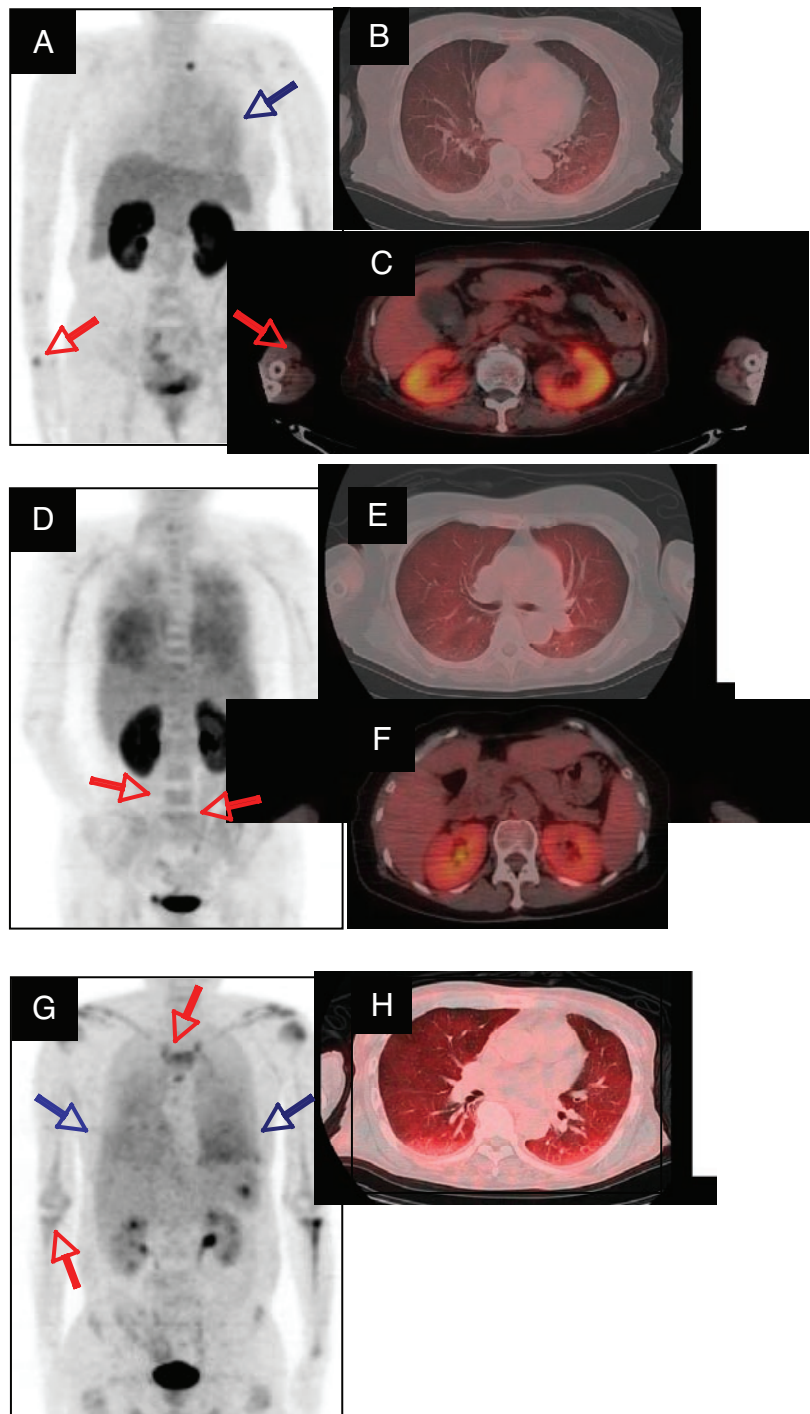


FIGURE 2. Positron emission tomography/computed tomography findings in patients with intra-vascular large B-cell lymphoma. A-C, Uptake of 18F-fluorodeoxyglucose (FDG) in the bilateral lung of a 74-year-old man, especially diffuse accumulation in the left lung field (A [blue arrows] and B), accumulation in the bilateral renal cortex (C), and multiple accumulations in the bones (A [red arrows]). D-F, Uptake of FDG with diffuse and intense accumulation in the bilateral lung of a 69-year-old woman (D and E), accumulation in the bilateral renal cortex (F), and multiple accumulations in the bones (D [red arrows]). G-H, Uptake of FDG with diffuse accumulation in the bilateral lung of a 64-year-old man, especially in the lower lung field (G [blue arrows] and H), and multiple accumulations in the bones (G, red arrows). FDG uptake was not observed in the bilateral renal cortex (G).